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CHINOOK CONSTRUCTION & ENGINEERING LTD.
ASSESSMENT REPORT ON THE RADAR GROUP
GREENWOOD MINING DISTRICT, B.C.
15 JULY 1977 - 23 AUGUST 1977

A.M. de Quadros, Ph.D.
Geologist

September 26, 1977

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INTRODUCTION

The Radar Group is part of the Granby Property, consisting of several claims assembled into one mining property jointly by Cassiar Asbestos Corporation Ltd., Consolidated Boundary Exploration Ltd. and Chinook Construction & Engineering Ltd. for the purpose of investigating the uranium showings in the Christina Range of the Monashee Mountains, approximately 12 kilometres NNE of Grand Forks, B.C.

During the period 15 July to 23 August 1977, the Radar Group was investigated by geological, geochemical and radiometric methods as part of a study of the Granby Property by Chinook Construction & Engineering Ltd. on behalf of the partners of the joint venture. The following is a report on the work carried out on the Radar Group.

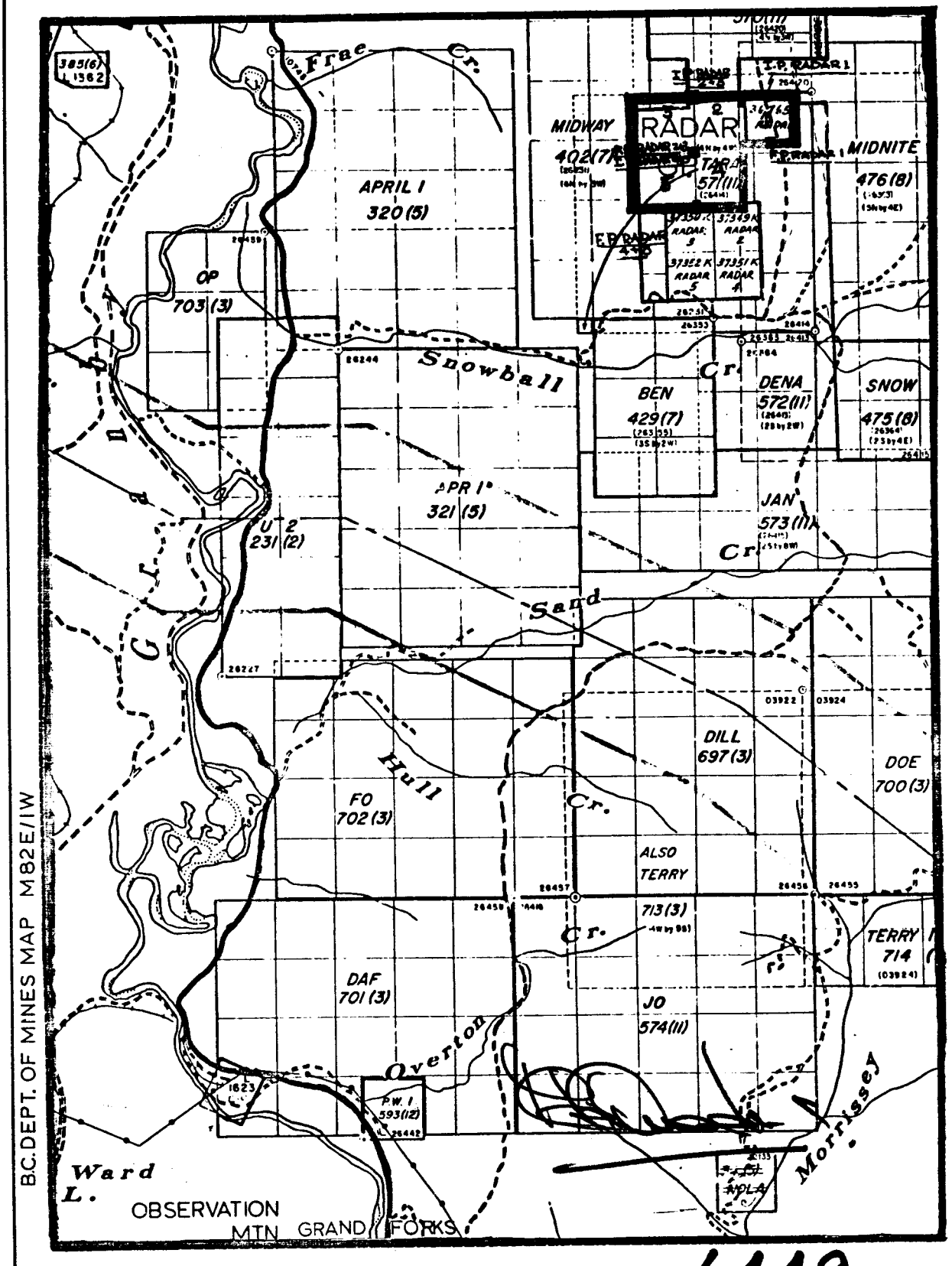

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FIG.I. LOCATION OF RADAR GROUP

Property

The Radar Group consists of 5 claims:

Name	Ref. #	Claim #	Tag #	Renewal Date
Radar	122-13	36765	47739M	10 Sep 77
Radar 2	122-9	37349	172801M	26 Aug 77
Radar 3	122-8	37350	172802M	26 Aug 77
Radar 4	122-7	37351	172803M	27 Aug 77
Radar 5	122-6	37352	172804M	27 Aug 77

Location and Access

The Radar Group is situated approximately 12 kms NNE of Grand Forks between Toronto and Snowball Creeks. The Group is shown on Fig. 1. Access to the property is by a NNE dirt road which joins Highway 3 just west of Grand Forks.

Topography

The Radar Group straddles a hill approximately 1600 metres in elevation and dropping down to approximately 1100 metres in the valleys. Several N-S creeks drain from the knoll, draining either into Toronto or Snowball Creeks.

Minor cliffs and scree slopes occur on the eastern and western slopes, though the dominant feature is the numerous north-south trending outcrops separated by seasonal creeks and swamps. Outcrop ranges from good to moderate; overburden generally thin and patchy.

General Geology

The general geology of the Grand Forks area has been presented in two publications:

a) H.W. Little, 1957: Map 6-1957, Kettle River, East Half Geological Survey of Canada. Scale 1 inch to 4 miles.

b) V.A. Preto, 1970: Structure and Petrology of the Grand Forks Group, B.C. Paper 69-22, Geological Survey of Canada.

The area is underlain by rocks of the Grand Forks Group, a raised fault block of high grade metamorphic rocks which are part of the Sushwap Metamorphic Complex. The rocks consist of biotite, amphibole and pyroxene gneisses and schists with minor quartzites and calcareous rocks. A later metamorphic foliation has been imposed on these rocks. the fold axes appear to be east-west. The whole complex has been intruded by the early basic sills and dykes (now amphibolites) and later acid intrusives ranging from quartz-diorites to quartz monzonite, monzonite and syenite. Block faults are prominent throughout these rocks. The rocks show extreme folding in a general NE - SW direction and prominent jointing and dyke emplacement in a rather N-S trend.

Maximum mineralization appears to be associated with pegmatite lenses and also in the north-south shear zones; the mineralization is predominantly uraninite and pitchblende. Secondary uranium minerals are rare, possibly due to the moderate raintall.

WORK DONE

Survey Grid

The N-S baseline established for the Granby Property runs through the Radar Claim. The claim was found to lie between 2500N and 3600N, extending from 950E to 350W. East-west cross-lines were turned off every 100 metres, flagged and chained with stations every 50 metres. Control lines running N-S were established at 2000E, 1000W and 2000W.

Geochemical Survey

Soil samples were obtained every 50 metres along the cross-lines; most of these samples were taken from the B soil horizon, generally between 15 and 50 metres. In the rocky areas where the B horizon is poorly developed, some of the samples were probably from the A horizon and erratic values were expected.

The samples were sent to Vancouver to Chemex Laboratories for uranium analyses. The analyses were carried out as follows:-

> 0.5 gms of -80 mesh sample were ashed and digested twice with 4M HNO_3. The residue was then dissolved in 25 ml 4M HNO_3 and shaken. After settling, 0.2 ml of the solution was placed on a platinum dish and evaporated to dryness. A pellet of uranium-fluorescent flux was added to the residue and fused at 650°C. The resultant pellet was placed in a Tanner III fluorometer, and its fluorescence compared with a standard pellet to an accuracy of 0.5 ppm uranium.

These analyses were plotted on a grid map and contoured on a statistical basis to outline anomalous areas.

Radiometric Survey

A radiometric survey was carried out, using two Scintrex GIS-4 gamma-ray spectrometers, capable of giving separate counts for K-U-Th, U-Th and Th. Three readings were taken for 3 second count times for each; the instrument was calibrated every two hours with a Scintrex thorium standards TS-1.

The GIS-4 spectrometers were used two ways:-

a. As a prospecting tool, the instrument was carried by hand, set for Total Count with a 3-second count time. The buzzer was set to go off at twice the background reading.

b. As a semi-quantitative tool, three readings were taken of each station with the instrument on the ground for Total Count, K-U-Th, U-Th and Th; counting time used was 3 seconds.

Geological Survey

The area was mapped both for geological and topographical features, much of the mapping being tied to the survey lines. Aerial photographs and photomosaics (1:5000) were also available. Representative rock samples have been collected for petrological work; these have been examined under ultra-violet light for autunite.

DISCUSSION OF RESULTS

Geology (Fig. 2)

The rocks of the Radar Group consist of medium grained well foliated biotite-gneisses interspersed with granodiorite, aplites, pegmatites and hornblende-diorites. A strong N-S structural feature is reflected in similarly oriented rock outcrops, seasonal streams and local but intense fracturing, especially in the finer grained rocks. East facing slopes are steep, reflecting the strong sub-vertical fracturing while the west facing slopes are essentially dip-slopes, with flat exfoliated talus.

The foliation of the biotite gneisses strikes about N310°, dipping SSW to SW, but varying when near to the hornblende diorite. Increased radioactivity is generally associated with the biotite-rich coarse pegmatites occurring within these gneisses.

The central area of the claims is characterised by a large outcrop of coarse-grained green hornblende diorite, typically with low radiometric values and strong magnetic properties. Hand specimens show that this rock consists of plagioclase, hornblende, biotite, pyroxene and accessory magnetite.

Contacts in the felsic rocks are gradational, the whole complex is best described as a migmatite; generally most aplites and pegmatites are too small for geological mapping. The quartz-rich aplites and pegmatites appear concordant with the gneissosity; the more feldspathic members may be vertical and possibly represent a later phase of intrusion controlled by the sub-vertical fracturing.

High radiometric values occurred in various rocks:

a. in biotite-rich lenses, up to 10 times the background count
b. at some hornblende diorite-biotite gneiss contacts, 3 to 4 times the background total count
c. in alaskite-pegmatites, up to 20 times the background total count

Uranium counts are generally not as high, though these rocks are usually spotted or covered with thin coatings of autunite and possibly carnotite. The possibility of a strong non-equilibrium uranium distribution in the rocks is being used to explain the low, erratic uranium readings.

Geochemistry (Fig. 3)

A total of 2879 geochemical analyses were available from the Granby Property and these values have been used to interpret the geochemical results. These analyses show a log-normal distribution, with a possible second population. The following are the values:

mode	0.5 ppm	
mean ($\bar{x}$)	1.5 ppm	
standard deviation (s) $\pm$	4.32 ppm	
threshold ($\bar{x}$ + s)	5.82 ppm	(6 ppm)
low anomaly ($\bar{x}$ + 2s)	10.14 ppm	(10 ppm)
high anomaly ($\bar{x}$ + 3s)	14.46 ppm	(14 ppm)

These values have been rounded off to those in brackets for contouring.

The Radar Group covers the first uranium find in this area, and extensive trenching and blasting has been carried out in

the early 70's. Oddly enough, the soil geochemistry does not confirm the obviously radioactive rocks seen in the trenches. It is presently believed that the lack of geochemical anomaly is due to poor soil development in these rocky showings. A similar problem occurred with a trial run with a soil-gas radon survey and it appears that a well developed soil profile is necessary for obtaining anomalous values.

The anomalous zones are:

a. Online 37N at 3W, a small N-S trending anomaly.
b. Several small anomalies south of 29N which lie within a broad low uranium background value and may in fact, be one large anomalous area.

Further field work is obviously necessary for a follow-up into the nature of these anomalies; further geological mapping, radon determinations and rock analyses are planned.

Radiometry

The background values obtained were:

1.	Total count	350-450 counts	(3 seconds)
2.	K-U-Th	7 - 12 counts	" "
3.	U-Th	4 - 12 counts	" "
4.	Th	0 - 4 counts	" "

Erratic readings were obtained over the Radar Group; these values range to over 10,000 counts per second (total count), though the U-Th counts go up to 50 counts. As many of these rocks have assayed well in the past, the serious problem of disequilibrium conditions must be suspected.

No specific rock type appears to be especially uraniferous; both alaskites and biotite-rich pegmatites have been found very radioactive. Though uranium counts are not often high, these rocks are often coated and speckled with autunite and minor carnotite.

The areas that are very radioactive are:

a. the No. 1 Showing
b. the No. 2 Showing
c. the area between 33N and 34.5N and 8W and 9W

The results of the radiometric survey are very encouraging; uraniferous rocks are not totally leached as elsewhere. Further more detailed radiometric work is planned in this area.

SUMMARY

The exploratory work on the Radar Group has proven to be very encouraging, and further work including trenching and drilling appear warranted by the results. Ten semi-quantitative assays on rocks in this area have been disappointing but assays in the past showed significant ore grade material with both U and Mo. It will be necessary to obtain fresh unweathered rock to obtain fairer estimates of the abundance of uranium in the showings.

A M. de Quadros
Geologist

STATEMENT OF COSTS

15 July 1977 to 23 August 1977

The following costs are assigned to the Radar Group:

1.	Wages		
	M. de Quadros, Project Geologist	8 days @ $90	$ 720.00
	K. Brodie, Geologist	10 days @ $80	800.00
	4 helpers	10 man days @ $60	600.00
		Total Wages	$2120.00
2.	Room & Board (Motel)		
	28 man days @ $30		840.00
3.	Transportation		
	3 4x4 trucks @ $500 per month		400.00
4.	Radon Work - 5 days		1000.00
5.	Gamma-ray Spectrometers		200.00
6.	Geochemical Analyses		700.00
7.	Expendables		100.00
8.	Report		400.00
			$5760.00

A.M. de Quadros
Geologist

STATEMENT OF QUALIFICATIONS

I, Antonio M. de Quadros, certify that:

a) I hold the following degrees in Geology:

B.Sc. Hons.	University of London	1964
M.S.	U.C.L.A.	1968
Ph.D.	University of Nairobi	1972

b) I have worked on geological projects since 1959, including:

i 1964-1965: Geologist, Geological Survey of Tanzania.

ii 1968-1972: Lecturer in Geology, University of Nairobi, Kenya.

iii 1973 : Geologist, Agilis Exploration Services, Vancouver, B.C.

iv 1974 : Geologist, Union Carbide Exploration, Vancouver, B.C.

v 1974-1975: Geologist, Dolmage Campbell & Associates, Diamond Drilling of Hat Creek Coal Deposit.

vi 1975-1976: Geologist, Kerr Addison Mines, Feasibility & Exploration, Grum Joint Venture.

vii 1976-1977: Geologist, Dolmage Campbell & Associates, Interpretation, Hat Creek Coal Deposit.

c) I am a pupil member of the Association of Professional Engineers of British Columbia.

A.M. de Quadros, Ph.D.
Geologist

TN

MN

I.P. RADAR 2+3

I.P. RADAR 1

RADAR 3

RADAR 2

RADAR 1

F.P. RADAR 2+3

I.P. RADAR 4+5

F.P. RADAR 1

F.P. RADAR 4+5

SHOWING

SHOWING

BASELINE

10W 5W 00 5E

37N 36N 35N 34N 33N 32N 31N 30N 29N 28N 27N 26N 25N

LITHOLOGY

5. Biotite - Gneiss
4. Grano - Diorite
3. Aplite
2. Pegmatite
1. Hornblende - Diorite
6. Overburden

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FIG 2: GEOLOGY RADAR

SCALE: 1:5,000

LEGEND

- Outcrop / Overburden
- Inferred Contact
- Swamp
- Seasonal Creek
- Access Road
- Abandoned Road
- Foliation
- Fractures

K.M.B 11 Sept '79

24 Sept. 1979.

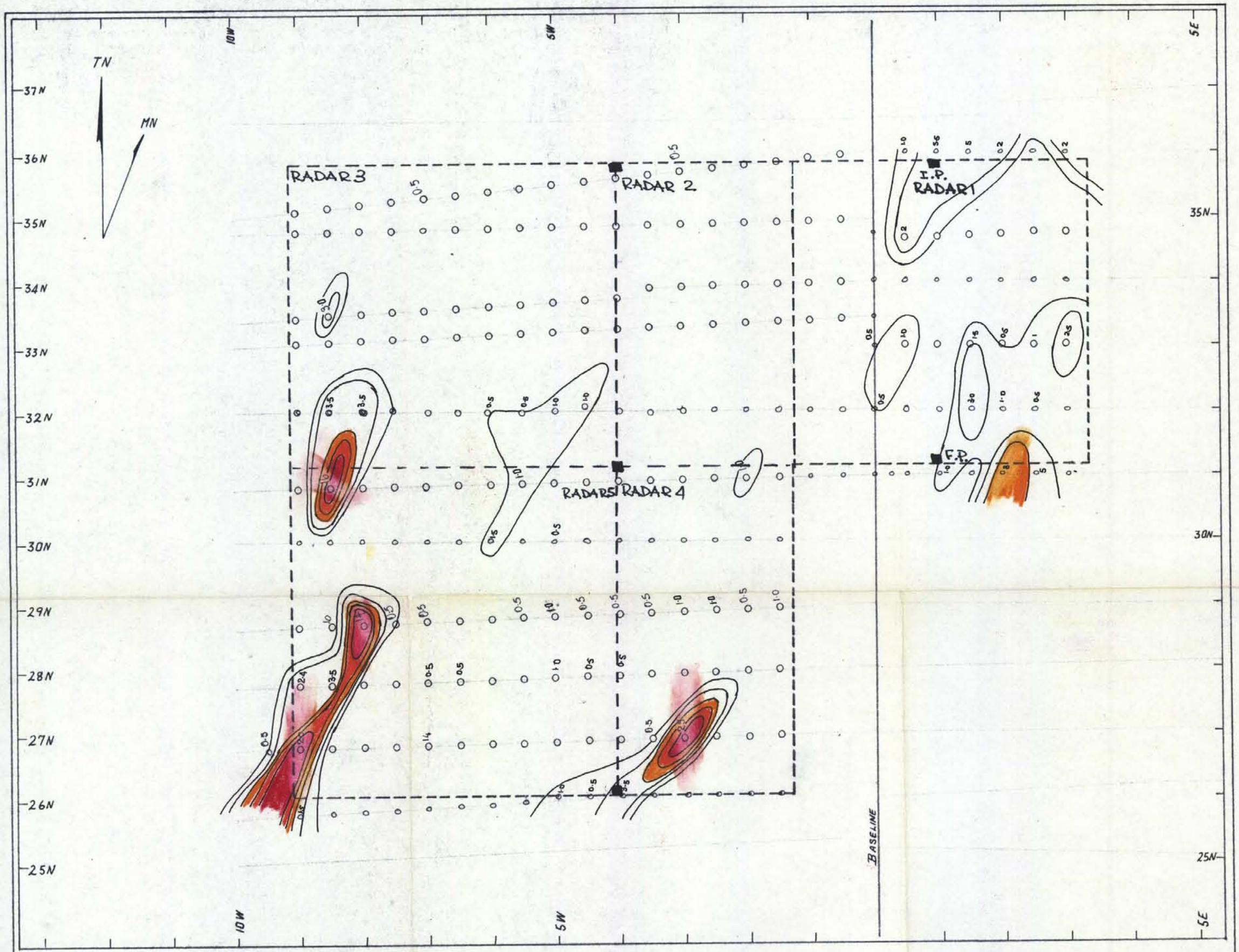

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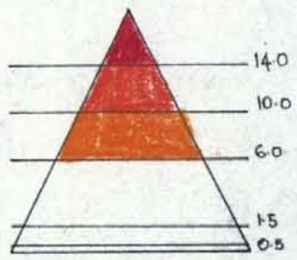
FIG 3: GEOCHEMISTRY - RADAR

SCALE: 1:5,000

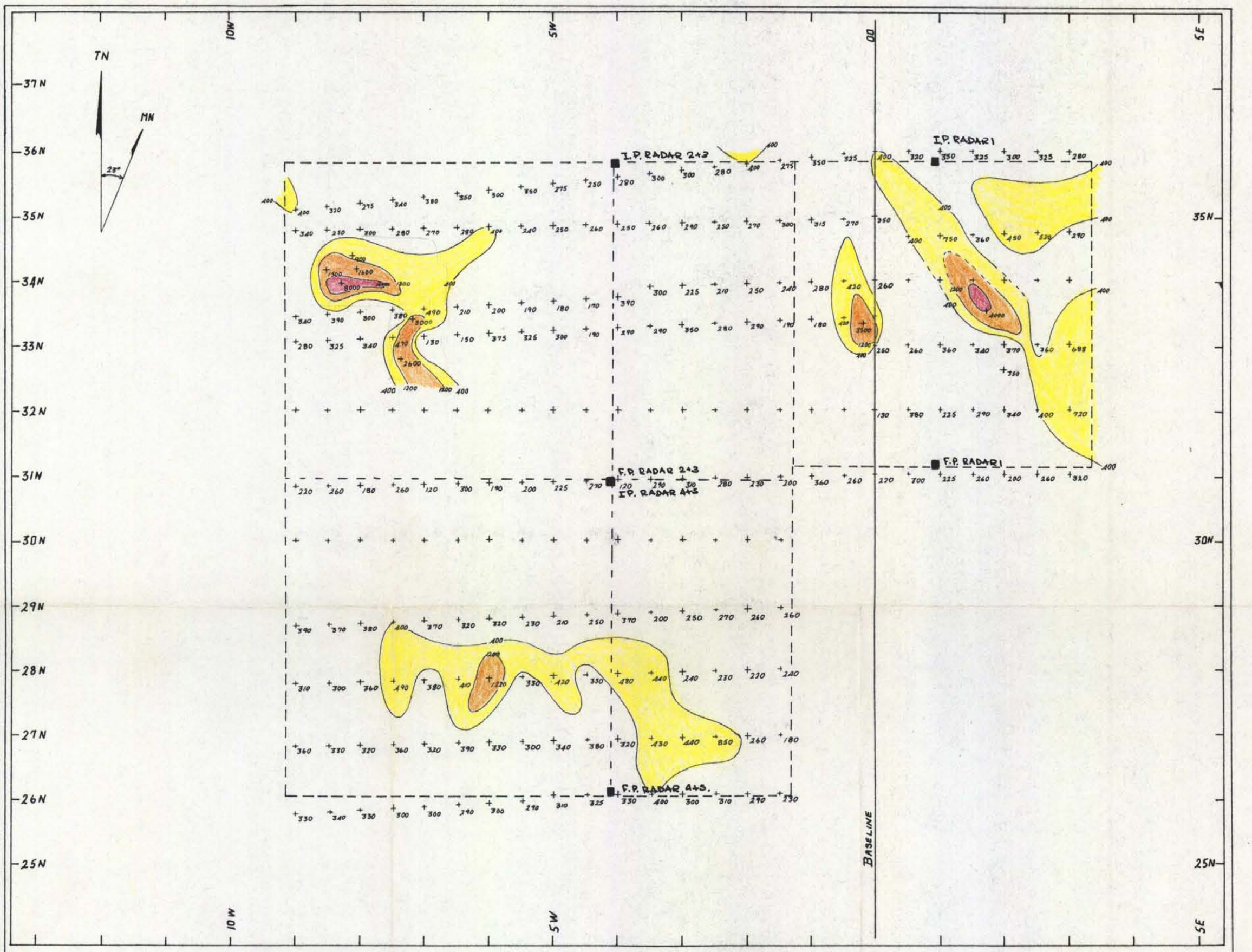
URANIUM (ppm) CONTOURS



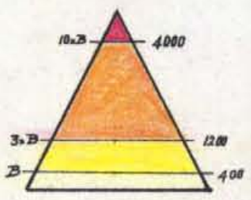
KEY

- ⌀ NO SAMPLE
- O SAMPLE U ppm < 0.5
- O2.0 SAMPLE, VALUE U in ppm

24 Sept. 1979. K.M.B 11 SEPT '79



CONTOURS(3 sec – counts)



INSTRUMENT : SCINTREX GIS-4

NOTE: No significant variations for K, U & Th

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FIG 4 : RADIOMETRY – RADAR

SCALE : 1:5,000

LEGEND

- ■ CLAIM POST
- ---- CLAIM BOUNDARY
- +320 STATION TOTAL c/sec
- 25N 10W SURVEY GRID

14 Nov. 1977 KMB 9 Nov '77